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The Silent Killer
Grant's Logistical Requirements 1864–1865

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A Monograph
by

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ABSTRACT

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This monograph examines Grant's campaign of 1864-1865 from a logistics prespective. It answers the following questions: 1. Did logistical systems change for the emerging operational level of war? 2. Did Civil War field logistics form todav's concepts at the operational level? 3. Were logistics planning factors derived from Napoleon? It concludes with a discussion of how Grant's systems impacted on 1992 logistics systems.

The monograph examines the history and formulation of operational requirements for the logistician. Discussed in detail is the necessity for theater base support, visibility and distribution, and the requirement for logistical planning factors. The conclusion is that each of these elements allows the commander to phase his operations, reduce risks and complete a campaign without creating operational pauses or logistical culmination.

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TABLE OF CONTENTS

INTRODUCTION

> The great logistician is the commander who has the judgement--indeed the genius--to take into account realistically all resources, at home, in the theater, or wherever they are found, and to balance his requirements and his mission so that his objective may be gained in the least possible time with the least possible loss of men and supplies.[1]

Logistics is the breath of an operation, and commanders for centuries have recognized its importance. In 1992, logistics and operations are inseparable due to the advanced technological world. Logistics systems created without proper study, forethought and actions such as follow through and implementation will force operational pauses, and terminate or lose campaigns for commanders. It is the silent killer on the battlefield.

Historically authors have not applied logistical knowledge to campaigns. In fact, "Logistical factors have been ignored by ninety-nine military historians out of a hundred--an omission which has warped their judgements and made their conclusions in many cases wildly misleading."[2] Why are logistical factors

ignored? Reasons often presented by historians include: no glory, difficult to understand, confusing and too complicated.

This study will fill the logistical gap for one period in history, Union Lieutenant General U.S. Grant's Campaign of 1864-1865. During this campaign the General of the Union Army, U.S. Grant, demonstrated his abilities as strategist, tactician, and above all, logistician. Using the campaign as a backdrop, the study will answer the question: How did General Grant utilize operational logistics to support the final campaign of the Civil War?

Campaign analysis will begin by exploring the idea that General Grant, General Montgomery Meigs (Quartermaster General of the Army) and Brigader General Rufus Ingalls (G-4 of the Army of the Potomac) utilized Napoleonic factors and evolving sustainment procedures to support the 1864-1865 campaign. Additionally, operational command and control structures will be discussed from the commander and national level. The analysis will then identify field army requirements to insure the ultimate objective of the supply system--i.e., the requirements of the soldier--are met. The analysis will conclude by

demonstrating the impact of both Napoleonic and Civil War Union logistical systems on future logistical operations.

LOGISTICS BACKGROUND

Grant's logistics system of 1864 is linked directly to the Napoleonic system. Initial linkage for Grant, Meigs, and Ingalls was at West Point as each learned the Napoleonic way of war by studying Antoine Jomini, a former staff officer of Napoleon.[3] Their course of study formed the basis for the knowledge of logistical systems as demonstrated by the fact that "Montgomery Meigs began early (1861) to strive toward the Napoleonic standard of baggage."[4]

This course of study was important because Jomini was the first author to write about logistical principles. In his initial writings Jomini defined logistics as "The practical art of moving armies. . . . including providing for the successive arrival of convoys of supplies. . . establishing and organizing lines of supplies."[5] Jomini's definition was integrated into the thought process of the senior officers responsibile for evolving the logistical systems of 1861-1865. To further exemplify these

studies, author Edward Hagerman states, "Military thinking, and even more, strategic organization, remained essentially within the Napoleonic tradition, filtered through an Eighteenth-Century world view."[6]

Jomini's education initiated from Napoleon, who embodied the match of logistician and operator. Napoleon learned the requirements for logistics the hard way in Italy in 1796, with a barefoot and starving army. From that time until his death, logistics had Napoleon's personal, although usually inadequate, emphasis.[7]

Napoleon was so attuned to logistical requirements that by 1805 he had established a staff structure to assist in his logistical planning and execution. He assigned an Intendant General as his Quartermaster General. The Intendant General's authority was restricted to the zone of operation or what constituted the theater rear. Organized under the Intendant was a bevy of workers, from masons to laborers to bakers. Workers were organized under five different staff sections. The breakdown of the staff sections resulted in the following responsibilities and functions:

1. VIVRES-PAIN provided bread and was organized into four brigades. Under VIVRES-PAIN was the PETITS VIVRES who provided salt, vinegar, wine,

brandy, and lentils. Each section was augmented by local contracting. Capacity of forty ovens was for one hundred thousand soldiers per day.

2. VIVRES VIANBE provided meat through purchase from local farmers or Grande Armee herds in the rear.

3. FOURRAGES provided hay, grain, and straw for the animals. The transportation units computed a requirement for fifty wagons to haul the forage for two thousand five hundred horses for two days. Enough wagons were not available so cavalry and other soldiers with horse requirements were required to scounge to feed their animals.

4. CHAUFFAGE provided fuel and candles to the rear.

5. HABILLEMENT provided uniforms and limited equipment.

6. THE TRAIN DES EQUIPAGES MILITAIRES was organized in 1807 to augment existing transportation. The organization of the Transportation Corps started as early as 1740. One battalion was assigned to each Corps and by 1812 twenty-three battalions were in existence. The staff was supported in the field by an established support apparatus.[8]

Napoleon's strategic supply system consisted of magazines, foraging, and contracts. The best example of the system utilizing magazines--sometimes called depots--foraging and contracts was in the 1812 campaign toward Russia. By 1811, the beginnings of storing large amounts of subsistence in magazines from Danzig to Warsaw commenced. Vilna was stockpiled "with

rations for 100,000 men for forty days, 30,000 pairs of shoes, 27,000 muskets and large amounts of beer and brandy."[9]

Civilian contractors purchased a large amount of the products and others were barged or brought by wagon to the magazines. Two specific examples of contract support were supplies going by barge and wagon to Danzig and Konigsberg. The system broke down early in 1812 so the units returned to foraging to fill soldiers' and horses' empty stomachs.

Additionally, Napoleon established logistical factors to ensure soldier survivability. Wagons included four to seven days of flour and biscuits and a standard issue of twelve wagons per one thousand men was established to carry subsistence, ammunition and the wounded. However, Napoleon would not allow wagon rations issued unless the army was near a depot.[10] This system allowed for resupply with no risk.

Napoleon also standardized soldier basic loads to sustain soldier readiness. A soldier's issue included two shirts, two pair of shoes, one pair of pants and sixty rounds of ammunition. Marching rations for one week included one portion of bread, four ounces of meat, two ounces of vinegar, and one ounce of brandy.[11]

Napoleon admitted the logistical system failed him and more importantly his soldiers. He stated, "The Imperial Army supply/logistical system is one of the least efficient branches. In interests of mobility and self-dependence, the needs to live off country and to make war support war were constantly reiterated."[12] A poor system, but it was the beginning of a support system to ensure Army and soldier readiness.

Specifically, four main points were established from Napoleon's logistical processes:

1. Bases of operations must be mobile to support a corps campaign. Lack of mobility causes loss of support.

2. Continuous logistical support is required for all campaigns. During Napoleon's trek through Prussia to Russia, he quickly realized the importance of continuous logistical support as he ran away from his strategic bases near Heidelberg and Wuerzburg. Soldiers who get hungry do not fight. By his return from Russia, the Grande Armee was in a state of disarray. Foraging became a way of life. Staff elements aided the commander in obtaining continuous support.

3. Logistical factors are required to plan campaigns. Napoleon was the first commander documented to use logistical planning factors to systemically support the force. Napoleon organized and utlilized wagon trains, soldiers' basic loads, and supply depots to the fullest to ensure soldier survivability and operational feasibility.

4. Transportation elements and structure are required. Operational tempo is a necessity and to

> maintain tempo (i.e., the continuous flow of supplies) Napoleon attempted to make wagons into the first transportation units to provide required tempo. Because of the poor condition of the roads and the lack of enough transportation assets, bases were required to be no more than one hundred miles from the forces. The organization of transportation assets was unsuccessful, but it was a beginning.

Napoleon attained his logistical knowledge through experience with an army of starving, barefoot soldiers. Conversely, Ulysses S. Grant began his logistical knowledge as a young boy serving as a transporter for his father's tannery company. Through this experience, Grant learned the requirements of wagons to utilize space to move the greatest amount of goods.

After graduation from West Point, Grant's logistical education continued as a field officer for the 4th Infantry Division in the Mexican War of 1846. It was here that the logistical concepts from Napoleonic study, and the experience acquired driving his father's wagons, were first utilized. Grant, with his experience and educational background, was assigned as regimental supply officer.[13]

As Grant began to practice his logistical knowledge, the United States Quartermaster Corps was experiencing severe problems similar to those experienced by Napoleon. First, base support from

Philadelphia to the armies in Mexico was execssively long. These long lines of support without mobile forward bases were causing supply shortages for the field army.

Second, and probably the most significant, was a lack of wagon transportation and any type of system to provide continuous logistical support. General Zachary Taylor, commander of the Army of the Rio Grande, required wagon standards to load the wagons. These standards allowed only the necessary supplies for sustainment to move. The wagons moved to established locations to support his Army and assist the corps with its mobility problems.

Third, logistics command and control was limited, causing breaks in logistical support. It was a new experience for the young United States to support over-extended supply lines and only through the efforts of young officers like Grant were soldiers supported successfully.

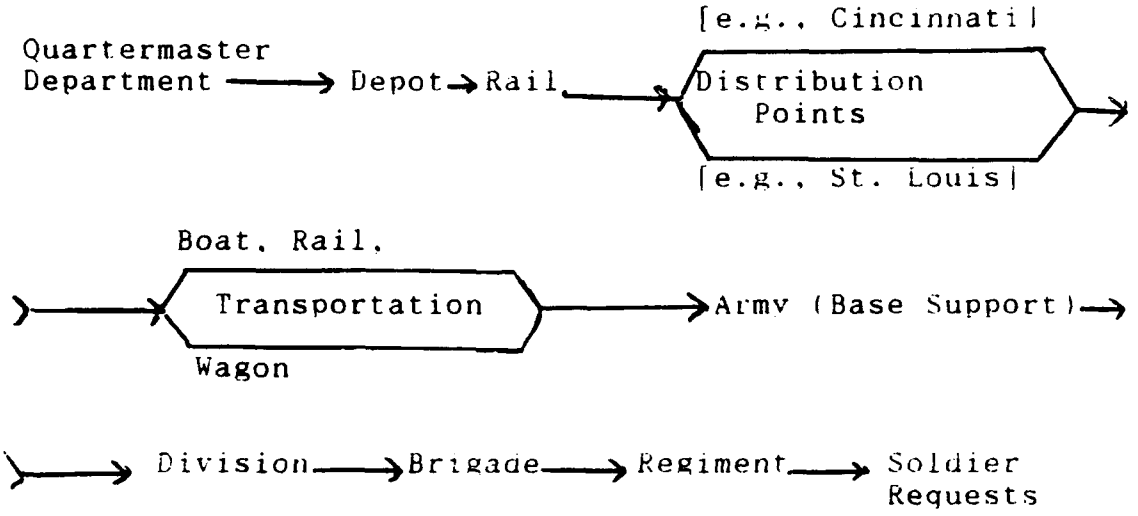
By 1846, Lt. Grant, as regimental supply officer under General Taylor's Army, was required to support a force stretched well beyond the Napoleonic standard of one hundred miles from the base. Extended lines of support required the army to live off the land with

periodic resupply. Lt. Grant had learned, above all, to take risks with campaign logistics. By the end of the Mexican war, Grant had become a master of the logistical art; he knew well the necessary planning factors, base requirements, and transportation demands to provide for an army on the march. He knew that the commander must plan for logistical support, but national level logistics were in need of refinement.

From commanders such as Zachary Taylor and young lieutenants such as U. S. Grant, American military leadership learned that their own planning and visions were no substitute for organization at the national level. Their best planning could not subsitute for supplies being pushed forward to the soldier from depots. Little improvement, however, was accomplished by national planners between 1848 to 1861. The nation was to enter the American Civil War without any logistical organization, transportation system, or leadership.

Prior to his assignment as Quartermaster General in 1861 Meigs wrote in his journal, "They had better make me Q.M. Gen'l than to keep up the present already rotten system."[14] Meigs was appointed Quartermaster General, as he had suggested, and implemented a supply

requisition and distribution system by 1862. The flow of requisitions and transportation was as follows:



The only exception to this system was the Army of the Potomac which requisitioned directly from the Quartermaster Department in Washington D.C.

Supply personnel organizations were assigned to utilize the requisition and distribution system. For example, at the regimental level, a Quartermaster (QM) Sergeant and QM Lieutenant were assigned. Brigade QM Captain and Division QM Major were presidential appointees and by 1862, the Corps QM Lieutenant Colonel and Army QM Colonel were appointed and present to complete the system.

Organization was not Meigs' only problem. Telegraph lines, new Springfield muskets, ironclads,

new artillery pieces, and thirty thousand miles of railroad contributed greatly to the operational and logistical requirements. With these innovations came additional requirements for command and staff organizations and procedures.

In 1860, the line unit commander was responsible for planning and implementing logistics, with most logistical requirements filled by contracts from local factories and farmers. Meigs moved contracting to the national level, but left authority for rail and steamboat repair parts at the field level under quartermaster personnel.

In addition to Meigs' national problems, new field army problems were arising. Field armies were moving farther from depots and base support than he had expected. He formulated a requisition and transportation system, but enormous refinement was required. Armies were moving more than one hundred miles from the base support, thus baggage needs and troop requirements increased. In 1861, Meigs was looking for visibility and distribution from depots to the regiments with first priority being organizational items, e.g., blankets, uniforms, and ammunition.[15]

Meigs, in desperation, utilized the planning factors of Napoleon and some experiences from the

Mexican War. His initial problems were: (1) limited command and control assets, (2) limited logistical factors available, (3) restricted cash flow, (4) small industrial capability, (5) limited visibility of stocks, and (6) virtually no distribution systems from the depot to field army. Additionally, Meigs knew that the citizen soldier required more rations--which accounted for approximately twice Napoleon's requirements per soldier.[16]

Meigs did have three major factors in his favor: (1) thirty thousand miles of strategic railroad, (2) a telegraph system, and (3) an ability to organize as he became the nation's first real logistician. War began while the union continued to search for logistical answers. Initially General George McClellan and the Army of the Potomac was logistically doomed. As McClellan retreated from the James River, he lost over two thousand five hundred wagons. These losses ocurred because of poor staff procedures and excessive wagon trains of twenty-six wagons per one thousand men--twice the Napoleonic standard requirement of wagon trains.[17]

Losses such as McClellan's forced commanders to emphasize logistical procedures within their organizations. Established logistical techniques would

not suffice, therefore a solution was required immediately because the North could not afford the continued loss of two thousand five hundred wagons per battle.

Napoleonic standards by horse and wagon were considered, but the commanders and Meigs were required to form standards different from Napoleon due to: (1) speed of rail movement which allowed quick resupply to armies from the base compared to wagons. (2) geographical vastness of the country which dispersed armies and caused them to be many miles from the division supply base or depot, and (3) thinly populated areas which made availability of foraging from local factories and farmers more difficult.

Additionally, commanders began to hire competent logistical personnel. By the Peninsula Campaign in 1862, McClellan had hired General Rufus Ingalls to be the G-4 of the Army of the Potomac. Ingalls was the first to establish order of march in field trains. Meigs and Ingalls became the backbone of the field system to ensure continuous logistics and survivability of the soldiers on the battlefield. Each logistician continued to wrestle with the problem of mobility as trains reached epic portions utilizing a standard of

fifty-five wagons per one thousand men--four times the Napoleonic standard.[18]

By Antietam in September 1862, McClellan had made progress in solving his mobility problems. Supply problems were also resolved except for some ordnance shortages. McClellan reduced requirements for wagons to thirty per one thousand men in an army that consisted of one hundred twenty thousand to one hundred thirty thousand men. Another of Ingalls and Meigs innovations allowed the logistics officer at division level to control wagon movements. This simple action enabled commanders to avoid congestion using their own initiative of when to move supplies and how many supplies were required.

McClellan had a transportation system at Army level that was functioning, but at the national level Meigs still had to contend with other problems. His most significant problem was that of supplying an army on the offense in a country where foraging was not always possible because population centers were often sparse. Regardless of innovations the march of the Union Army would not allow for transportation or sufficient quantities of end items to provide adequate support.

Montgomery Meigs believed the French flying column of Algeria and Morocco to be his answer.

> The soldier in the flying column carried eight days compressed rations, including desiccated vegetables on his back. He carried a blanket, but no overcoat. The men were divided into squads of eight, one of whom was to carry a covered cooking kettle, another a large mess tin, another an axe, another a pick, and one a shovel. One man in each company carried the hospital knapsack. Each man carried his share of a shelter tent.[19]

Flying columns allowed for self-sufficient troops for approximately eight to twelve days and, coupled with rear trains (ten days of supply), became a successful system as the army prepared for Gettysburg in 1863. The Army of the Potomac, with one hundred forty-two thousand men, now required twenty wagons per one thousand men to sustain itself.[20]

By August 1863, the Army issued a general order for the following wagon allocations:

> 6 wagons/1000 men for baggage
> 7 wagons/1000 men for subsistence
> 5 wagons/1000 men for ordnance
> 2 wagons/1000 men for medical supplies.[21]

This equalled Ingalls' twenty wagons per one thousand men and finally established a standard. Additionally, movement tables were formulated, which created a

distribution system. The system was effective enough that:

> As June 1864 approached already: 2.7 million bushels of corn; 21 million bushels of oats; forty three thousand bushels of barley; 270 tons of hay; and eight thousand tons of straw had been utilized, which constituted over eight thousand six hundred rail cars and five hundred and sixty barges by canal.[22]

Operational sustainment from the theater to tactical formations had been formulated as Grant prepared for the final campaign.

Grant's Final Campaign

On March 17, 1864, Lieutenant General U.S. Grant assumed command of the Union Armies and with it (in his words) a system that displayed the battlefield of a "Quartermaster best organized in the field."[23] By his assumption of command the following principles had been established at the field army and national level:

1. Transportation elements are key to continuous operations. They allow the armies to reach the battlefield, and to continue fighting until termination is reached.

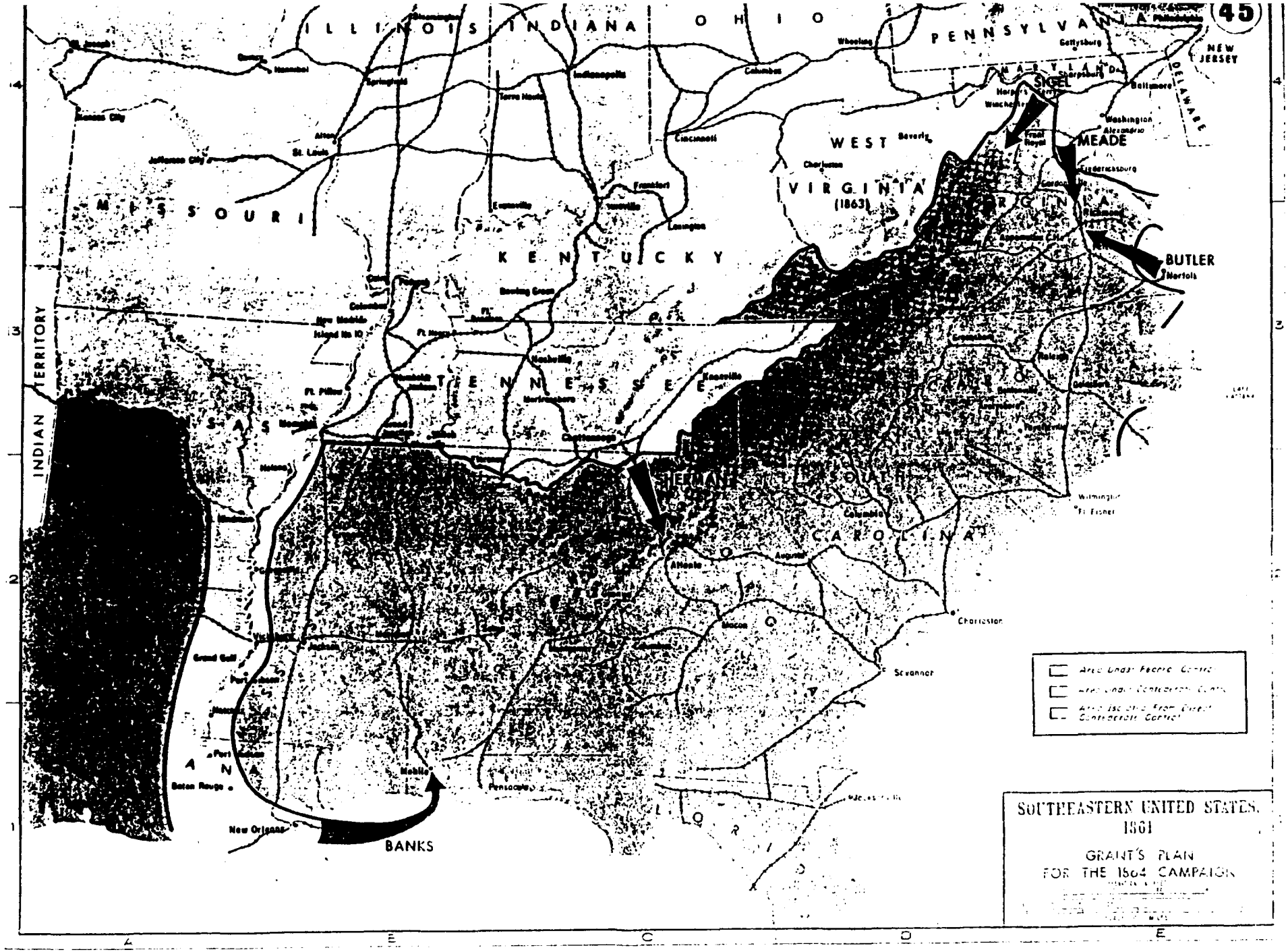
2. Operations and sustainment are equal partners in any campaign.

3. Force sustainment and the sequencing of sustainment operations are vital elements to campaigns.

Grant understood these principles and in his memoirs wrote, "To provision an army campaigning against so formidable a foe through such a country, from wagons alone seemed almost impossible. System and discipline were both essential to its [campaign] accomplishment."[24] Even with this perception, Grant saw no need for a new logistics staff.

Logistical staff organization for the new commander was not perceived as a problem. Grant had Meigs at the national level as his G-4 (by responsibility, but not title). Grant, as commander, coordinated logistical requirements with Meigs. Meigs maintained the logistical system established prior to 1864 as Grant wrote orders for his 1864-1865 campaign which involved a campaign consisting of five armies in four different regions of the United States. The armies were: Banks in New Orleans, Butler in Norfolk, Sigel in the Shenandoah Valley, Meade moving towards Fredericksburg, and Sherman in Chattanooga.(See Map 1)[25]

Logistically, small changes in field army organization were required as Meigs and Ingalls continued to organize from the Napoleon standard. Additionally, Ingalls implemented a procedure to



SOUTHEASTERN UNITED STATES, 1861

GRANT'S PLAN FOR THE 1864 CAMPAIGN

MAP 1

abolish the French flying columns, because soldiers were not complying due to weight requirements.

Soldiers on short campaigns of two to three days and on the eve of the battle were allowed to carry a rolled blanket with no knapsack or overcoat. In addition, Meigs urged that, "the soldier can carry three days cooked food in his haversack. If necessary, he can carry two or three days bread and some underclothes in his blanket."[26] These changes were made to reduce wagon loads required for subsistence and to allow the soldier to move farther without resupply.

As Grant moved with Meade and the Army of the Potomac, he said,

> There never was a Corps better organized than was the Quartermaster Corps with the Army of the Potomac in 1864. With a wagon train that would extend from Rapidan to Richmond, we could only carry three days forage, about ten to twelve days rations, besides a supply of ammunition.[27]

Grant showed little concern logistically for the armies of Banks, Butler and Sigel, and left the logistical systems in the hands of Meigs. He was confident that logistics would not be a problem except for Sherman in the Southeast. Base support, logistical command and control, and transportation systems were

established and only required continued refinement. Grant was so confident that he seldom mentions logistics in his memoirs.[28]

The remaining two armies of Meade and Sherman required emphasis with Sherman's requiring the most support. Ingalls had a plan for the Army of the Potomac and prepared the Army by initially setting up the trains to allow for sustainment and maneuverability as follows:

2 wagons for Headquarters
7 wagons for One thousand men
50 wagons for Cavalry
3 wagons for Hospital
1 wagon for Commissary[29]

Additionally, Meigs purchased eighty-seven thousand new horses in the first nine months of 1864 to allow the Army of the Potomac to remount twice while on the move.[30]

Preparations were not complete, but Grant could wait no longer, as the Army of the Potomac began the campaign across the Rapidan through the Wilderness. The moves occurred so rapidly that logistics appeared to be in a state of disorganization. Forward bases were established at Aquia, Bell Plain, and Fredericksburg in early May; but by May 21, 1864, all

were closed and supplies moved to Port Royal to better support forward. Ingalls initiated changes to support one hundred twenty-five thousand soldiers. Ingalls stated:

> Troops were ordered to carry fifty rounds of ammunition and three days rations, while three days beef on the hoof (eight thousand to ten thousand) cattle accompany the Army, and the supply train carries ten days subsistence and forage. The number of horses and mules for cavalry, artillery, officers' mounts and trains totaled more than fifty-six thousand. It took twenty thousand men to handle the four thousand three hundred wagons and eight hundred thirty-five ambulances.[31]

Massive trains and movement were required to continue to support the battle. Emptied wagons were required to return immediately to the depot. Continuous logistics was a requirement, as Grant knew Lee would escape if pressure was stopped. Grant wanted to have no break so consequently no logistical pauses would be tolerated.

As Grant moved to Petersburg, City Point, Virginia became the largest seaport and forward base in the war. The Army of the Potomac required forty steamers, seventy-five vessels, and over one hundred barges to support itself. In addition to the forward bases,

depots were meeting requirements for the five armies simultaneously without significant shortages.

At this point Grant was to cross the James River and lay siege on Petersburg. No bridges, ferries or pontoons existed at City Point to allow the supplies to move with the Army of the Potomac. By June 15, 1864, a pontoon bridge was completed and wagons with supplies crossed the James River, making City Point the largest forward base of the war. City Point became the base that Grant required to maintain his momentum. Everything from hospitals, to horse shoeing facilities, to supply wagons was available. By October 1864, eighteen trains a day were moving forward to the Army. "The daily consumption of supplies was enormous. In the matter of forage alone, the animals required six hundred tons of grain and hay daily."[32] The Army of the Potomac never lacked subsistence, ammunition or forage.

In summary, logisticians for the Army of the Potomac were superb performers. Command and control, base support, planning factors and transportation were all synchronized to ensure mission accomplishment. Operations were so synchronized that neither Grant nor Meigs writes about the logistical aspect of the campaign.

Major General Sherman utilized every facet of logistical resources to accomplish his "March to the Sea". Overall, Sherman utilized the four main logistical components of forward base support, command and control, transportation and logistical planning factors to perfection.

Sherman's plan was initiated in March 1864, when he met with commanders in Chattanooga. He knew Nashville was his chief depot, with resupply to the depot made from Louisville by rail and the Cumberland River by barge. Sherman built a forward supply base at Chattanooga, which inadvertently hit upon a political sensitivity.

Union sympathizers in Tennessee had been receiving supplies by rail. Sherman had to cut off supplies to the sympathizers to obtain the necessary rail to build his supply base. This caused the sympathizers to raise a howl to the presidential level. The president acquiesced to Sherman and Sherman quickly doubled the size of his supply base in Chattanooga.[33]

Even with this problem solved, Sherman could not provide enough resources by rail to supply his planning force figure of one hundred thousand men and thirty-five thousand horses--factoring the raids and train

wrecks. Sherman understood the magnitude of the problem and,

> estimated it would take one hundred and thirty cars of ten tons each to reach Chattanooga daily, to be reasonably certain of an adequate supply. Even with this calculation, we could not afford to bring forward hay for the horses and mules, nor more than five pounds of oats or corn per day for each animal. I was willing to risk the question of forage in part because I expected to find wheat and corn fields and a great deal of grass, as we advanced into Georgia at that season of the year. The problem then was to deliver at Chattanooga and beyond one hundred and thirty car loads a day, leaving the beef cattle to be driven on the hoof and all the troops in excess of the usual train guards to march by the ordinary roads.[34]

Sherman's Quartermaster quickly ascertained that it was an impossible task with available transportation assets. Sherman immediately began to confiscate every available train and received assistance from the President of the Louisville and Nashville Railroad who produced cars and locomotives for his operation.

Even with this massive buildup of trains, Sherman's soldiers and wagon trains required reduction to minimums for existence. Sherman's logistical planning factors were supporting his operational plan as he reduced his wagon trains to a minimum of materials required for existence. For example, Sherman would not allow tentage for shelter. Troops were to

use only tent flies for cover. He gave the order that, "Each division and brigade was provided a fair proportion of wagons for a supply train and these were limited to carry food, ammunition and clothing."[35] Like Napoleon en route to Russia, living off the land was Sherman's only reserve. Twenty days rations was the standard to be carried by each wagon train.[36]

On May 5, 1864, the campaign began per Grant's orders with troops of Major General James McPherson, Army of Tennessee, arriving in Chattanooga by rail and foot; Major General George Thomas, Army of the Cumberland, ready at Ringgold, Georgia; and Major General John Schofield, Army of Ohio, in the vicinity of Cleveland, Tennessee. The battles progressed until 20 May when the first operational pauses were taken because of logistics, as Sherman outran his damaged rail lines. Several days were required to repair the rail lines and to reestablish lines of support before Sherman moved.

The Army moved toward Dallas on May 20, 1864 and on to Marietta, Georgia. This move required support by wagons with twenty days rations (over less than acceptable roads) until Allatoona Pass--with its rail--could be secured. This stage of the campaign ended on 4 June and logistics had not been a barrier to success,

although the lines of support were now strung over two hundred miles from Nashville to Big Shanty, Georgia.

July and August witnessed the successful Battle of Atlanta, but it was costly as the rail out of Atlanta was demolished. Thomas' thoughts on the 30th of August as phrased by Sherman were:

> We had cut loose from our base of supplies, and the seventy thousand men were then dependent for their food on the chance supplies of the country (already impoverished by the requisitions of the enemy) and on the contents of our wagons.[37]

By mid September, Sherman settled in Atlanta with secure lines and open rail. Success was achieved at Atlanta although rebels were constantly interdicting the more than three hundred miles of lines of communication. Logistically, the campaign was a success and planning can be summed up by a story conveyed by Sherman at Big Shanty:

> Well the Yanks will have to git up and git now, for I heard General Johnston himself say that General Wheeler had blown up the tunnel near Dalton, and that the Yanks would have to retreat, because they could get no more rations. "Oh Hell!" said a listener, "don't you know that old Sherman carries a duplicate tunnel along?"[38]

By October 21, 1864, defense of Atlanta was becoming difficult. Confederate General John B. Hood was on the loose, continually attacking the long lines

of communication. Sherman knew they must move and Savannah was the choice.

Grant, moving with the Army of the Potomac, did little to assist Sherman as he prepared for the move to Savannah. Since Grant had no supply staff, Sherman went directly to Meigs for depot support. Sherman divided his G-4 section into a forward and rear echelon and gave the following orders to them:

To General L.C. Easton, chief Quartermaster of Combined Armies in Chattanooga, Sherman said:

> Go in person to superintend the repairs of the railroad and make all orders in my name that will expedite its completion. I want it finished, to bring back from Atlanta to Chattanooga the sick and wounded men and supply stores. On the first of November I want nothing in front of Chattanooga except what we can use as food and clothing and haul in our wagons. There is plenty of corn in the country and we only want forage for the posts.[39]

To General Amos Beckwith, forward Quartermaster in Atlanta, Sherman stated:

> On the first of November I want nothing in Atlanta but what is necessary for war. Send all trash to the rear at once, and have on hand thirty days food and but little forage. I propose to abandon Atlanta and the railroad to Chattanooga to Sally Forth to ruin Georgia and bring up on the seashore. Make all dispositions accordingly. I will go down the Coosa until I am sure that Hood has gone to Blue Mountain.[40]

Sherman cut his supply lines on November 12, with major risks, but his risks were offset by logistical

artistry. Command and control, aided by logistical planning factors, ensured soldier survivability. The risk was that forage was available and that resupply would occur only in limited amounts.

Sherman's march to the sea order was extensive and paragraph three and four gave his logistical direction. The logistical segment of the order read:

> Special Field Order No. 120: November 9, 1864.
>
> 3. There will be no general train of supplies, but each Corps will have its ammunition-train and provisions-train distributed habitually as follows: Behind each regiment should follow one wagon and one ambulance; behind each brigade should follow a due proportion of ammunition-wagons, provision-wagons, and ambulances. In case of danger each Corps Commander should change this order of march, by having his advance and rear brigades unemcumbered by wheels. 4. The Army will forage liberally on the country during the march. To this end, each Brigade Commander will organize a good and sufficient foraging party, under the command of one or more discreet officers, who will gather, near the route traveled, corn or forage of any kind, meat of any kind, vegetables, corn meal, or whatever is needed by the command, aiming at all provisions for his command, and three days forage.[41]

Total for the move was approximately twenty-five hundred wagons, and six hundred ambulances. Soldiers' basic load was to be forty rounds of ammunition. By December Sherman neared Savannah, requiring only bread.

Sherman concluded that the factor to control Army movement was twenty days of supplies stored in wagon

trains controlled by experienced Quartermasters at regimental through Army level. The most efficient wagon was pulled by six mules carrying three thousand pounds or one regimental store for one day. Driving cattle along allowed for two days' rations per one thousand men. Corps required three hundred wagons for food and three hundred additional wagons for clothing, forage, ammunition, and other store.[42]

To alleviate transportation requirements, Sherman revised soldier basic loads. His standard load included:

> forty to sixty rounds of ammunition, his shelter tent, a blanket or overcoat, and an extra pair of pants, socks, and drawers, in the form of a scarf, worn from the left shoulder to the right side in lieu of a knapsack, and in this haversack he should carry some bread, cooked meat, salt, and coffee. I do not believe a soldier should be loaded down too much, but including his clothing, arms, and equipment, he can carry about fifty pounds without impairing his health or activity. A simple calculation will show that by such a distribution Corps will thus carry the equivalent of five hundred wagon loads--an immense relief to the trains.[43]

Logistical factors established by Sherman were the direct result of railroad utilization. Sherman stated that the battle of Atlanta would not have occurred without rail. He summed it up by stating "thirty-six

thousand wagons of six mules each, allowing each wagon to have hauled two tons twenty miles each day, a simple impossibility."[44]

Sherman's organizational systems at Corps level utilized base support, planning factors, transportation availability and foraging to meet his requirements. Base support was consistent prior to Atlanta, and after Savannah when alternate bases were set up by Meigs at Hilton Head, South Carolina; Pensacola, Florida; and Port Royal, Virginia.[45] In conclusion, "Sherman left a heritage of successful experimentation in logistical organization for the strategic offensive in the mid nineteenth century warfare."[46]

IMPACT ON PRESENT AND FUTURE LOGISTICAL OPERATIONS

Jomini asked the question, "Is logistics simply a science of detail? Or on the contrary, is it a general science, forming one of the most essential parts of the art of war? Or is it but a term, consecrated by long use, which designates collectively the different branches of staff duty?"[47]

Grant's campaign demonstrated that operational logistics is a general science. Before 1864, logistics for Grant and the nation consisted primarily of marches

and camps. By June 1864, Grant--and especially Sherman--realized more must be considered. Logistics became a permanent part of their planning and encompassed much more than preparing for the march and organizing massive wagon trains of baggage, ammunition, subsistence, and medical support.

Civil War logistics incorporated new approaches to an old problem of supplying the soldier. Four elements changed from Napoleon to Grant. They are:

(1) Command and Control (C^2).
(2) Base support.
(3) Transportation.
(4) Planning system to ensure continuous logistics (logistical factors).

Each element is distinct and each element leads us to today's logistical principles as they relate to operations. A discussion and comparison of each element follows.

(1) Command and Control is the commander's responsibility. Grant's campaign plan of 1864 served as the vehicle for commanders and staff to attain the strategic objective of annihilation of the Confederate Army. The overall plan provided the operational direction for tactical commanders. Grant did little to direct or make major changes to the established logistical principles of Meigs, but by 1864 logistical

problems at the national level were resolved. Quartermaster officers were appointed and were an integral part of the staff from battalion to depot level. The logistical chain of command for personnel and requisitions was functional. Grant's greatest contribution was his guidance to subordinate commanders and logisticians, allowing the logisticians to plan for support of the current and next battle.

(2) Base Support is critical to maintain continuous logistics. Base support must be mobile below the depot level and contain all services and supplies. From this base, interior and exterior lines of support will be established. The Army of the Potomac base reached back to Philadelphia, and the interior lines reached to Petersburg. Additional or forward bases were established as required to support the Army of the Potomac. The movement forward of supplies and services to the regiment became the key to campaign success.

(3) Transportation systems enable supplies to reach the battlefield and allow the campaign to continue. Grant and Napoleon proved there is never enough transportation, however, Grant adapted his operations to ensure transportation supportability. Grant and his commanders learned that too many wagons

were a tactical target, and adapted the number required to the operation to ensure sustainment.

(4) Logistical planning systems are required to support operations. Logistical planning was required prior to any operation to enable the logistician and the commander the opportunity to reduce risks. The basic element of the logistical planning system was planning factors. Logistical planning factors allowed Grant and his commanders to continue logistical support without pauses in operations. Estimating numbers of wagons, rounds of ammunition per soldier, and rations stored on wagons became second nature to Grant as he planned operations. Sherman became the master of planning maneuver as he consistently displayed his dependence on logistical planning factors.

These four principles have stood the test of time and are now a functional element of logistician and commander of the 90's. The best example for use of the four elements occurred in 1990-1991 Desert Shield/ Desert Storm operations. Desert Storm occured in Saudi Arabia and Kuwait and was an operational campaign with assigned forces from the United States and other countries of the world order. Implementation of the four required logistical elements by the joint U.S. planners follows.

Command and control logistical requirements for General H. Norman Schwarzkopf, CINC U.S. Central Command (CENTCOM), and Grant were similar. First, they both had to think big as operational commanders. Schwarzkopf had multiple armies maneuvering simultaneously requiring logistical support, as did Grant. Schwarzkopf had an advantage over Grant because he had a Deputy Chief of Staff for Logistics (with staff) which enabled him to plan and utilize his logistics effectively.

Transportation infrastructure and required forward basing was an issue for initial planning. The road network for Desert Storm was insufficient to continually support forces in northern Saudi Arabia. CENTCOM, as an operational headquarters, attempted to overcome lack of infrastructure by forward basing up to five days of Class I (water), Class III (fuel), and Class VII (major end items).

Logistical planning factors played a relevant part in Desert Storm, as logistical planning was the strength of CENTCOM. Prior to the maneuver logistical planning estimates for the U.S. forces included (1) 2.5 million gallons of fuel per day which required five hundred truck loads per Corps, per day, (2) One thousand one hundred and twenty-five military fuel

tankers available for fuel movement per day, and (3) route length requirements of five hundred twenty-eight miles for one route of movement. These critical factors, plus forward basing, allowed for continuous support to forward based units.[48]

The most important similarity, however, was their ability to analyze logistical estimates and then apply risks to the operations where shortages appeared. This ability allowed them to accomplish the mission. Key to this point remains the fact that a continuous flow of logistics was required.[49] Desert Storm was as much a success in 1991 for the United States as Grant's campaign was in 1865, and again validated the requirement for the four logistical elements.

CONCLUSIONS

Logistics played an integral role in Grant's campaign success which led to the conclusion of the Civil War in April 1865, at Appomattox Court House, Virginia. This paper has focused on four major elements that form the basis of logistical planning and execution to support the operational commander and subsequently his campaign. The commander with these tools controls the critical link to success.

The commander must be a great logistician. Joint Publications 1, Joint Warfare of the U.S. Armed Forces, states that there are four parts to the commanders concept of the campaign plan. They are operations, logistics, deployment, and organization.[50] Two of the four are the responsibility of the commander's logistician and he impacts on the other two parts. Consequently, the operational commander must understand logistical principles to set the preconditions for battle.

Additionally, the commander must realistically train himself and his subordinates to ensure campaign success. Every opportunity must be taken to enhance commander and staff knowledge and experience in the aforementioned logistical principles. Operational commanders and schools all too often incorporate logistical concepts into planning and teaching as an afterthought. Current computer war simulations, such as the Army's Battle Command Training Program (BCTP), are requiring commanders to train in logistical principles, but this one program is not enough. All operational war simulations, command post exercises, field training exercises, or operational lesson plans

must include logistical training. Failure to include logistics in training could ultimately cause campaign failure.

Generals Napoleon and Grant understood the operational logistical requirements. Grant's campaign of 1864-1865 gave the logistical requirements for success to future commanders. Yet, the question remains, will the commander of tommorrow allow logistics to become the "Silent Killer"?

ENDNOTES

[1]James A. Huston, Sinews of War: Army Logistics 1775-1953, (Washington, DC: Office of Military History, U.S. Army,1966), 153.

[2]Michael Howard, The Causes of War and other Essays, Second Edition, (Cambridge, Massachusetts: Harvard University Press, 1983), 102.

[3]W.D. Droke, Grant the Logistician, (Fort Leavenworth, Kansas,: U.S. Army Command and General Staff College, Student Study Project, 1981), 11.

[4]Edward Hagerman, The American Civil War and the Origins of Modern Warfare, (Bloomington and Indianapolis: Indiana University Press, 1988), 44.

[5]Antoine Henri Jomini, Jomini and His Summary of the Art of War, ed. by Brigader General J.P. Hittle, published in Roots of Strategy Book 2 (Harrisburg, PA: Stackpole Books, 1987), 528-530.

[6]Hagerman, 27.

[7]Col. John R. Elting, Swords Around a Thorne: Napoleon's Grande Armee, (New York, NY: Free Press, 1988), 558.

8Ibid., 553-554.

[9]Ibid., 566.

[10]3rd Infantry Division Officers Staff Ride brief. March, 1991, Jena, Germany.

[11]Ibid.

[12]David Chandler, The Campaigns of Napoleon, (New York, NY: Macmillan Publishing Co., 1966), 336.

[13]Droke, 10-11.

[14]Russell F. Weigley, Quartermaster General of the Union Army, (New York, NY: Columbia University Press, 1959), 161.

[15]Visibility and distribution in this paper are defined as the ability to know where supply stocks are available for issue (i.e., depots) and to disperse them immediately to meet the needs of the requisitioner.

[16]Hagerman, 45.

[17]Ibid., 51.

[18]Ibid., 62.

[19]Ibid., 71.

[20]Ibid., 74-75.

[21]Ibid,., 77.

[22]Weigley, 271.

[23]John T. Simon(ed), The Papers of Ulysses S. Grant, (Carbondale, Illinois: Southern Illinois University Press), 197.

[24]Mary Drake McFeely and William S. McFeely, Ulysses S. Grant: Memoirs and Selected Letters, (New York, NY: Library of America, 1990), 476.

[25]Thomas E. Griess, Series Editor, Atlas for American Civil War, (Wayne, NJ: Avery Publishing Group, Inc., 1986), 45.

[26]Hagerman, 249.

[27]McFeely, Ulysses S. Grant: Memoirs, 523.

[28]Ibid., 480-755.

[29]Huston, 216.

[30]Weigley,296.

[31]Huston, 724.

[32]Erna Risch, Quartermaster Support of the Army: History of the Corps 1775-1939, (Washington, D.C.: Center of Military History, United States Army, 1989), 435.

[33]William S. McFeely, Memoirs of General William T. Sherman, Volume II, (New York, NY Da Capo Press, 1984), 1-15.

[34]Ibid., 11.

[35]Ibid., 22.

[36]Huston, 236.

[37]McFeely, Memoirs of Sherman, 106.

[38]Ibid., 151.

[39]Ibid., 58.

[40]Ibid., 159.

[41]Ibid., 174-176.

[42]Ibid., 176-210.

[43]Ibid., 390.

[44]Ibid., 398.

[45]Hagerman, 287.

[46]Ibid., 292.

[47]Jomini, 528.

[48]Col Joe Purvis, CENTCOM Plans Officer, briefing presented to SAMS, at Fort Leavensworth, KS: October 1, 1991.

[49]Ibid.

[50]Joint Pub 1, Joint Warfare of the U.S. Armed Forces, (Washington, D.C. National Defense University Press, 1991), 47.

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